FLANDERS DC
INSPIRING CREATIVITY

Knowledge Partner

Vlerick Leuven Gent Management School

the Autonomous Management School of
Ghent University and Katholieke Universiteit Leuven

RESEARCH REPORT

AMBIDEXTROUS INNOVATION BEHAVIOUR IN SERVICE FIRMS

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FLANDERS DISTRICT OF CREATIVITY

Flanders District of Creativity is the Flemish organization for **entrepreneurial creativity.** It was founded in 2004 by the Flemish Government as a non-profit organization and enjoys broad support. Flemish businesses, academia, and public institutions use Flanders DC as a platform for cooperation in the pursuit of a more creative Flanders region.

Creativity is the key ingredient in making companies more successful and in helping regional governments ensure a healthy economy with more jobs. Flanders DC inspires creativity and innovation:

1. by learning from the most **creative regions** in the world,
2. by igniting **creative sparks** in everyday life and business, and
3. by providing **research, practical business tools and business training,** in cooperation with the Flanders DC Knowledge Centre.

1. Districts of Creativity: Inspiration from the most creative regions

Responses to global challenges are best found within an international network of excellence. With the single aim of learning from the very best, Flanders DC aims to unite the most dynamic regions in the world within the 'Districts of Creativity' network. Every two years, Flanders DC convenes the Creativity World Forum, bringing together government leaders, entrepreneurs, and knowledge institutions to exchange ideas about how to tackle pressing economic problems and make their regions hotbeds for innovation and creativity.

2. Raising awareness: The best way to predict the future is to invent it

Flanders DC encourages entrepreneurs and citizens to look ahead and find creative solutions today for tomorrow's problems. Flanders DC has developed an idea-generation tool to encourage people and organizations to take the first step toward innovation. In addition, Flanders DC has run an awareness campaign entitled 'Flanders' Future' and has collaborated with national TV station één (VRT) on an idea show named The Devisers (De bedenkers).

3. The Flanders DC Knowledge Centre: Academic support

The **Flanders DC Knowledge Centre** serves as a link between Flanders DC and Vlerick Leuven Gent Management School. Each year, the Flanders DC Knowledge Centre publishes several reports and develops various tools, case studies and courses. All these projects focus on the role of creativity in a business environment and identify obstacles to, and accelerators of competitive growth.

The **Creativity Talks** – brief monthly, interactive info sessions – update you on these research activities. See www.creativitytalks.be for a current calendar and subscription information.

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In addition to these research projects, the Flanders DC Knowledge Centre has also developed the following tools and training sessions:

- **Ondernemen.meerdan.ondernemen**, an online learning platform
- **Creativity Class** for young high-potentials
- **Flanders DC Fellows**, inspiring role models in business creativity

FLANDERS DC FELLOWS

- **Creativity Talks**, monthly seminars on business creativity and innovation
- **Innovix,** online innovation management game
- **Flanders DC Academic Seminars,** research seminars on business creativity and innovation
- **TeamScan**, online tool

TEAMSCAN

- **Web 2.0 Readiness Scan**
- **HR Toolbox**

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'In 2020 moet Vlaanderen een economische, innovatieve, sociaal warme, ecologische en duurzame topregio zijn'
(Vlaanderen in actie – Toekomstplan voor 2020)

Knowledge creation, especially the transformation of knowledge into innovation has become the key driver of wealth. Innovation has taken shape as one of the most important explanatory elements for long-term growth. Ambitious goals are set for Flanders, a region that should become one of the top innovative regions in Europe. Today and in the near future, still a lot of efforts need to be done in order to achieve this top position.

Flanders is characterized by a small open economy, experiencing high competitive pressures. Knowledge sourcing and innovative activities are more than ever important in the current economic climate. Managers are aware of the need to move quickly toward new opportunities, to adjust to changeable markets and to avoid satisfaction. Keep doing well what you do to today (exploitation) and in the meantime preparing your firm for the future (exploration) is called ambidexterity. Empirical evidences have shown that firms that **balance their explorative and exploitative innovation efforts to be effective in the short run and to survive in the long run outperform firms that are not able to achieve this balance.** However, balancing exploration and exploitation is far from easy as both often draw from the same resources, yet ask for a very different strategic mindset.

The service industry has passed manufacturing and agriculture to become the fastest-growing and most dominant industry in each of the world's key economies, also in Flanders. Although services have become a dominant economic driver, little research focused on the service industry. This report addresses the call for more research and focus in the area of service innovation by examining in-depth the ambidextrous innovation behaviour of Flemish service firms. For this purpose, we compare firms in the manufacturing sector with service firms.

Via a literature review (Part I), a survey approach and case studies (Part II and III), we aim to increase our understanding of **the innovation behaviour in service firms compared to manufacturing firms**. Should service firms become more ambidextrous, i.e. does ambidexterity make service firms more profitable in the long run? Another mechanism to balance exploration and exploitative innovation effort is the punctuated equilibrium mechanism, whereby over time explorative and exploitative efforts are balanced. Is this an equally viable mechanism to achieve ambidexterity, so that an organization can pick one or the other at will? How can service firms organize their innovation process to achieve a balance between exploration and exploitation?

The focus of the empirical section is twofold. First, we investigate how service firms differ from manufacturing firms in their explorative and exploitative innovation behaviour and whether this matters in terms of performance (Part III chapter 1 and 2). For this we use existing longitudinal data from the Flanders Community Innovation Survey and Bel-First database. Second, we investigate why and how service firms show ambidextrous or punctuated equilibrium behaviour as a way to achieve a balance between exploration and exploitation. For this latter purpose we conduct exploratory case studies in three service firms in Flanders (Part III chapter 3).

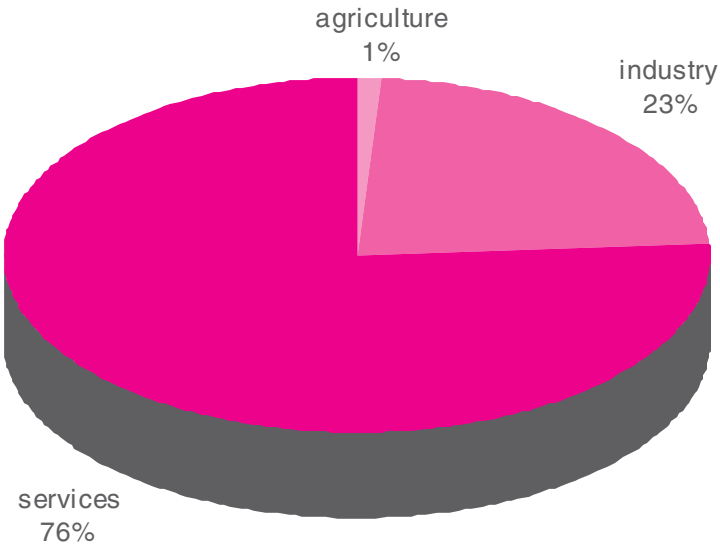
Finally, we **formulate managerial recommendations** (Part IV) and **policy guidelines** (Part V).

1. Innovation in service firms vs manufacturing firms

We can define our industries into three broad sectors. The primary sector entails farming, forestry and fishing. The secondary sector is defined by manufacturing and the tertiary sector encompasses services. Historical data show a shift from the primary sector, through the secondary and finally the tertiary sector. The service sector has grown steadily and became the major contributor to GDP (Desmet, van Looy, & Van Dierdonck, 2003).

The contribution of the three sectors to total GDP in Belgium is presented in Figure 1.

Figure 1. GDP – Composition by sector (%) in Belgium 2008 (CIA, 2009)



Following the Oslo Manual, we define innovation as 'the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations' (OECD, 2005). Innovation thus implies both totally new and significantly improved products, processes or methods. A distinction can be made between two types of innovation: radical and incremental innovations. Radical innovation (exploration) entails discontinuous innovation that are 'radically new' and 'really new' from a firm's or customers' perspective (Garcia & Calantone, 2002; Reid & de Brentani, 2004). Incremental innovations (exploitation) are small improvements in existing products, methods and processes that let the company operate more efficiently and deliver greater value to the customers (Leifer, McDermott, O'Connor, Peters, Rice, & Veryzer, 2000; O'Reilly & Tushman, 2004).

Innovation has long been linked to technology driven product- and process innovations in the manufacturing industry. The majority of innovation studies have used the industrial sector as a reference, putting the service sector aside. As services often do not produce technologically advanced

artefacts they are often considered as being non-innovative rather than true innovators. Den Hertog (2000) argued that the dominant view of innovation in services portrays the process as supplier-dominated innovation, with service firms being dependent on their suppliers for innovative inputs. However, nowadays, the service sector is shedding their image of being mainly non-innovative or supplier driven. This is related to an alternative view of services being different innovators compared to manufacturers, or the perspective that innovation in services focuses more on the 'softer' aspects of innovation based skills (Gallouj, 2002; Miles, 2008).

Earlier studies point out several significant differences in innovation between service firms and manufacturing firms. Miles (2008) argues that only a small segment of service innovation conforms to the typical manufacturing-based model, in which innovation is largely organized and led by formal research and development (R&D) departments and production engineering. Innovation costs are often lower for innovation in service firms. Service firm innovation budgets tend to be lower (Arundel, Kanerva, van Cruysen, & Hollanders, 2007). Patent mechanism as a form of intellectual property is rarely used. If protection mechanisms are used, it are typically trademarks and design rights (Arundel et al., 2007). Tether (2005) found that services place less emphasis on 'hard' sources of technology and knowledge and place greater emphasis on 'softer' sources such as the use of cooperation practices. Building trust with customers and engaging with them to understand their needs is often the starting point for innovation in services, while the customer interaction process is less emphasized in innovative activities by manufacturing firms (Bradshaw & Turner, 2008).

The level of innovation activity varies considerably across the different manufacturing and services industries. According to Pires, Sarkar and Carvalho (2008), there is no evidence that one sector significantly dominates the other in terms of innovation. Their results reveal that the most innovative service industries are as innovative as the most innovative manufacturing industries. Manufacturing leads in intramural R&D, machinery acquisition, pioneer innovators and process innovators while service firms have more innovative behaviour in extramural R&D, R&D cooperation, training activities and 'product' innovation (Pires et al., 2008).

Camacho and Rodriguez (2008) argue that all the firms within the same industry do not innovate in the same way. There is no 'standard' or 'unique' pattern of innovation in each industry. There are multiple modes of innovation, but some are more commonly found amongst services whilst others are mostly found amongst manufacturers. In such a way it is possible to find service firms that report using the sources of advanced technologies and having innovation strengths that are much more typical of manufacturers, just as it is possible to find manufacturers using the sources of technology and having the innovation strengths that are more commonly found amongst service firms.

In conclusion the literature suggests that there are differences between manufacturing and service firms, but it does not seem to be more significant compared to industry differences. Theoretical explanations are scarce.

2. Ambidexterity or punctuated equilibrium

In the current economic climate, managers know the importance of adaptability. This means the ability to move quickly toward new opportunities, to adjust to volatile markets and to avoid complacency (Birkinshaw & Gibson, 2004). Following O'Reilly & Tushman (2004), we use the metaphor of the manager as a juggler. Figure 2 shows us that managers who integrate and reconcile both exploratory and exploitative activities can produce a continuous stream of innovations, encompassing both incremental and radical innovations.

Figure 2. The manager as a juggler, producing a continuous stream of innovations

The implementation of incremental innovations is dependent on the exploitation competencies a company has (Leifer et al., 2000; O'Reilly & Tushman, 2004). In this research report we therefore use a firm's incremental innovation efforts to assess its level of exploitation. We use a firm's radical innovation efforts as a measure to assess its exploration efforts. Those innovations concern the development of new business, services or product lines that transform the economics of business and therefore require exploration competencies (Garcia & Calantone, 2002; Reid & de Brentani, 2004).

A solely focus on exploration or exploitation has negative implications for the firm. Firms who exclusively engage in explorative innovations will experience high costs of experimentation without gaining many benefits. On the opposite, firms who concentrate exclusively on exploitative innovations are likely to find themselves trapped in suboptimal stable equilibria (March, 1991).

Consensus exists on the need for balance between exploration and exploitation, so firms can be effective in the short run and survive in the long run (Benner & Tushman, 2003; He & Wong, 2004; Sheremata, 2000; Tushman & O'Reilly, 1996). However, it is still unclear how this balance can be achieved. The literature defines two mechanisms to help organizations realize this balance:

ambidexterity (Benner & Tushman, 2003; Burgelman, 2002; Van Looy, Martens, & Debackere, 2005) and punctuated equilibrium (Levinthal & March, 1993; March, 1991; Siggelkow & Levinthal, 2003).
Ambidexterity is defined as the synchronous pursuit of both exploration and exploitation via loosely coupled and differentiated subunits or individuals, each of which specializes in either exploration or exploitation (Gupta, Smith, & Shalley, 2006).
Punctuated equilibrium refers to temporal rather than organizational differentiation and suggests that cycling through periods of exploration and exploitation is a more viable approach than a simultaneous pursuit of the two (Gupta et al., 2006).

Exploration and exploitation innovation activities ask for a very different strategic mindset and management style (Benner & Tushman, 2003; Gupta et al., 2006; March, 1991). Separation has the advantage of specialization on explorative and exploitative tasks. Upon separation, exploration and exploitation can be viewed as orthogonal tasks that enforce each other, making it feasible to pursue ambidexterity (Gupta et al., 2006). Separation can be done structurally, i.e. in different organizational units or over time. In this study we differentiate between two types of ambidextrous innovation behaviour: ambidexterity, exploring and exploiting simultaneously and punctuated equilibrium, exploring and exploiting over time in alternating phases.
We have two reasons to hypothesize why in service firm a punctuated equilibrium model may be preferred above the ambidexterity model. Firstly, empirical research suggests that the balance between exploration and exploitation might be less important in environments characterized by low technological dynamism (Uotila, Maula, Keil, & Zahra, 2009). These authors refer to the fact that trying to achieve an optimal balance between exploration and exploitation is most important in high R&D intensive industries. Most service firms operate in less R&D intensive industries. Secondly, under the assumption that services only exist upon their creation, it may be difficult to establish a unit that is dedicated to explorative innovation in a service context. Thomke (2003), showed how the Bank of America has dedicated a few of their Atlanta offices to innovation. However, even these initiatives are often more of an incremental nature. He stated that as customers often do not understand radical changes, it is better to go in multiple small steps. If this would be true, simultaneously pursuing exploitative and explorative innovation activities may not be feasible in service firms.

Based on these theoretical findings, we hypothesize that service firms achieve a balance between explorative and exploitative behaviour by punctuated equilibrium, while the majority of manufacturing firms achieve this balance through ambidexterity.

3. Balancing innovation behaviour and its influence on performance

The relationship between innovation and business performance has been explored by multiple studies. Since exploitative and exploratory orientations draw from the same resources but ask for a different strategic mindset, researchers debate how firms can achieve both orientations. They also question whether different means i.e. ambidexterity versus punctuated equilibrium lead to the same performance. It has been argued that firm performance is enhanced when firms engage in sufficient exploitation and enough exploration (Gibson & Birkinshaw, 2004; He & Wong, 2004; Levinthal & March, 1993).

He and Wong (2004) provided empirical evidence to prove that, by surveying 206 manufacturing firms, the interaction between explorative and exploitative innovation strategies is positively related to sales growth rate. Recent research revealed highly significant correlations between ambidexterity and performance (Birkinshaw & Gibson, 2004; Schulze, Heinemann, & Abedin, 2008; Uotila et al., 2009). Lubatkin et al.(2006) found that the joint pursuit of an exploratory and exploitative orientation affects performance. However they state that more longitudinal research is needed.

Based on our previous assumption that service firms will prefer the punctuated equilibirum model, we also assume that this model has a stronger effect on performance in service firms than in manufacturing firms.

We focus on the examination of innovation behaviour in service firms by a longitudinal research design that emphasizes innovation activities in Flemish service and manufacturing firms. The propositions stated in part I can be transformed into four testable hypotheses:

- Manufacturing firms achieve a balance in their explorative and exploitative behaviour by ambidexterity.
- Service firms achieve a balance in their explorative and exploitative behaviour by punctuated equilibrium.
- The positive effect between ambidexterity and firm performance is stronger in manufacturing firms than in service firms.
- The positive effect between punctuated equilibrium and firm performance is stronger in service firms than in manufacturing firms.

1. Quantitative study

Innovation in services can be measured based on two different perspectives. The first option consists in directly applying to services the concepts and indicators traditionally used in manufacturing. This approach is defined as 'assimilation' and creates 'subordinated surveys'. The second option consists of defining new concepts and measurements for innovation in services. This approach is known as 'demarcation' and results in 'autonomous surveys' (Djellal & Gallouj, 1999; Drejer, 2004).

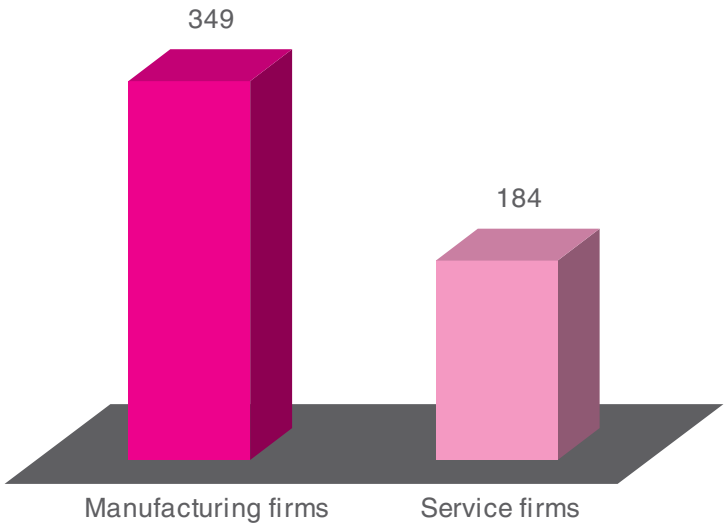
The OECD 'Oslo Manual' provides a methodological framework to collect data on both service and manufacturing firm's innovation activities and performances. This manual has been converted into operational terms by Eurostat, with the creation of the Community Innovation Surveys performed in all EEA Member States (OECD, 2005). Our empirical research makes use of data generated by a subordinated survey, the Community Innovation Survey (CIS).

1.1. Sample

Our longitudinal approach consists of the Flemish CIS data observed from 1st January 2002 until 31st December 2006, taken from CIS4 and CIS5.[1] Flanders is characterized by a wide range of manufacturing and service companies. These data were collected through a census sampling for large size firms (i.e. with 250 or more employees), and stratified random sampling for the other firms. Size and sector were used as stratification variables. We have merged the data files of CIS4 and CIS5 to one separate data file based on the company's ID. Our sample finally consists of 533 firms who participated to both CIS4 and CIS5. Figure 3 shows that 349 firms of our sample belong to the manufacturing sector while 184 firms belong to the service industry.

1 We would like to thank Steunpunt O&O indicatoren for providing us the CIS databases.

Figure 3. Sample



1.2.Measures

Our dependent variable is *Performance Growth.* We assessed the growth of each firm based on four items during the period 2002-2006: average firm size growth, average turnover growth, average net added value growth and average total assets growth (Cronbach's alpha = .76). This data is taken from the Belfirst database.

The distinction between service and manufacturing firms is labeled *Firm Type*. We recoded the NACE codes represented by the CIS into a different variable that represented the firm type. This leads to the creation of a dichotomous variable with a value 0 for service firms and value 1 for manufacturing firms.

Exploration is made operational as producing new or significantly improved products or services, or producing products or services that are new to the market during the 2002-2006 period. *Exploitation* captures new or improved methods geared at the production process, the logistics or distribution, or supportive systems of either goods or services. Both are taken from the CIS survey.

Innovation Behaviour. As our hypotheses concern the explorative and exploitative innovation behaviour during the period 2002-2006, we created innovation behaviour as a categorical variable. We distinguished five categories and transformed them into dummy variables: *Exploitation, Exploration, Punctuated Equilibrium, Ambidexterity, No innovation.* The latter is used as the reference category for our analysis. For more detailed analyses, these variables were in a second phase transformed to three categories *Innovation behaviour* balance. In the definition of this variable exploitation or exploration are captured into a single category, *Unbalanced Behaviour*. *Punctuated equilibrium* and *ambidexterity* were labelled *Balanced Behaviour,* as both types of innovation behaviour are balancing exploitation and exploration. The no innovation category remains *No Innovation Behaviour.*

Other factors may have influenced innovation behaviour and firm performance. We therefore include several control variables. *Type of engagement in R&D*. Two types are defined, continuous and occasional engagement. This variable indicates the strategic importance of innovation for a firm. *Firm Size*. Previous studies based on CIS data showed that the propensity to innovate increases with firm size (Drejer & Leiponen, 2004; Evangelista & Mastrostefano, 2006). This variable is defined by the total number of employees in 2006. We applied a logarithmic transformation for normality to normalize the initial strongly skewed data on number of employees. *R&D Expenditures*. The R&D expenses of a firm might have a significant influence on the effect of innovation behaviour on firm performance (He & Wong, 2004; Uotila et al., 2009). This variable includes all expenditures for R&D performed within the firm, regardless of the source of funds.

1.3. Methods

For our initial quantitative analysis we have used descriptive statistics and cross-tabs. We performed a contingency table to obtain insight into the relation between firm type (services or manufacturing) and innovation behaviour. Because our dependent variable for testing hypotheses 1 and 2, innovation behaviour, is categorical with more than two categories we had to conduct a multinomial logistic regression analysis. The hierarchical regression analyses were used to examine the link between innovation behaviour and firm performance. We use for both regression analyses the non-innovators as a reference group because it has the highest frequency (N=169).

2. Qualitative study

In order to examine in-depth why and how service firms show ambidextrous or punctuated equilibrium behaviour as a way to achieve a balance between exploration and exploitation, we conduct exploratory case studies in three service firms in Flanders.

Case studies are defined as rich, empirical descriptions of particular instances of a phenomenon that are typically based on a variety of resources (Yin, 1994). The phenomenon we examine is ambidexterity and punctuated equilibrium in service firms.
Our units of analysis was the innovative behaviour at the level of the firm. The multiple case study research were executed in cooperation with Innovatiecentrum Vlaams Brabant, Oost-Vlaanderen and West-Vlaanderen.

2.1. Sample

We showcased twelve service firms out of our original database sample. They were selected on the type of innovation behaviour and are spread around the service economy. The twelve firms contained four ambidextrous service firms and eight firms that use the punctuated equilibrium mechanism. We phoned the CEO's of the twelve companies and send an additional email with detailed information concerning the case research. Three managers were willing to participate. Four companies doubted the relevance of their case for our research, since they produced both products and services. We decided not to include these firms. The five remaining sample members refused participation because of lack of time or no interest.

- **Case A**: Company A is a travel agency with offices in five locations in Flanders. During the last 35 years, this company turned into a full-service firm. Exploratory and exploitative innovation activities are crucial according to the top management.
- **Case B**: Company B is a study and design office. Over a period of 20 years this company has become a significant player in the market with 25 employees. Quality, timeliness and presentation are the three key values for this company.
- **Case C**: Company C is a wholesaler and supplies defined segments of industry. This company is part of a multinational concern with more than 50 companies in 24 countries. According to the managing director of the concern, innovation leads to better performance and sharing knowledge is viewed as the foundation for successful collaborations. The Flemish plant follows the punctuated equilibrium model.

2.2. Measures

An exploratory case study approach was used to gain more knowledge in how and why service firms achieve a balance between exploration and exploitation.
The exploratory case research entails different measurements: innovation audit, structured questionnaire, interview, archival data.

The innovation audit[2] is developed by six regional offices for innovation (Regionale Innovatie Stimulering of RIS) in cooperation with IWT (agentschap voor Innovatie door Wetenschap en Technologie). This tool measures the innovation power of both manufacturing and service SMEs and compares the firms with best practices. Eight management fields are defined, based on the degree of possible influence they have on innovation success:

- Innovation strategy
- Market orientation and customer orientation
- Employee and company culture
- Service / Product innovation
- Process innovation
- Realization methods
- Networking
- Financing

The audited firm receives a score on each of the management domains. To assess the relative importance of each domain, specific coefficients are applied. Finally a total innovation power score is obtained. The audits are performed by the experts. Marc Tiri or Bart Hommez and Bert Reekmans, of respectively the Innovatiecentrum Oost-Vlaanderen and Vlaams Brabant. The result is a full report with practical advice which is delivered during a feedback visit.

The audit builds the basis for our knowledge on the firm's innovation behaviour. To gain further insight, the innovation audits were supplemented by a structured questionnaire that concerned the services produced or delivered by the firm, the organizational structure and the organization of innovation projects. The questions are partly based on the questionnaire used by Blindenbach-

2 More information is available on http://oost-vlaanderen.innovatiecentrum.be/diensten/innovatieaudit/

Driessen (2006). Additional questions regarding the explorative and exploitative innovation activities were asked during the interview with the CEO or CTO.

Following Paswan et al. (2009), we distinguish three contextually relevant dimensions in which service innovation is anchored: environmental uncertainty, strategic orientation and market orientation.

2.3. Methods

The case studies were two-fold and the duration of the first visit was half a day. First an innovation audit was performed by the Innovatiecentrum. Second, we provided the CEO of company 1 and 2 with a structured questionnaire and we conducted a short interview. Since company 3 is a larger company, our research included the participation of five people, who participated to the audit and structured questionnaire (manager technology center, sales manager, logistics manager, controller and business unit manager). The few additional interview questions were answered by the manager of the technology center. After one month, we had a second visit to each company where we provided feedback on the innovation audit and practical advice in order to optimise the innovation capabilities of the company.

The results are presented in three sub sections. First, we describe the results of our data analysis concerning the innovation behaviour of Flemish manufacturing and service firms. Second, we present the outcome of the regression analysis explaining ambidexterity, punctuated equilibrium and their effect on firm performance growth. Third, we point out the results of the case studies that provide us with in-depth information on why and how service firms organize a balance between explorative and exploitative innovation activities.

1. Innovation behaviour of manufacturing and service firms in Flanders

We explored the longitudinal innovation behaviour of Flemish firms during the period 2002-2006. The results for manufacturing firms are shown in Figure 4. 27% of these firms do not innovative at all. 30% are ambidextrous. The punctuated equilibrium mechanism is followed by 24% of the manufacturing firms. These firms alternate their focus on incremental innovations through exploitation, with a period of radical innovations through exploration. 14% of the manufacturing firms solely exploits, while only 5% exclusively develops radical innovations by exploration.
54% of the manufacturing firms are balancing exploration and exploitation through ambidexterity or punctuated equilibrium. 56% of these firms use the ambidexterity model, 44% the punctuated equilibrium model. This supports the hypotheses that in manufacturing firms the ambidexterity model prevails above the punctuated equilibrium model.

The segmentation analysis for the service firms, represented in Figure 5, shows that 41% of the service firms do not innovate. This means that 74 firms out of our total sample of 184 service firms say they are not having exploitative or explorative innovation efforts. The punctuated equilibrium model is practiced by 24% of the service firms, the ambidexterity model by 20%. A single focus on incremental innovations is applied by 13% of the service firms, whereas 2% of the service firms point out to concentrate on exploration only.
We thereby also find support for the second hypothesis that service firms balance exploration and exploitation more often by the punctuated equilibrium model than the ambidexterity model. Of the service firms with balanced innovation behaviour, 45 % balance exploration and exploitation through ambidexterity, 55% use the punctuated equilibrium model.

Figure 4. Segmentation of manufacturing firms according to the five types of innovation behaviour

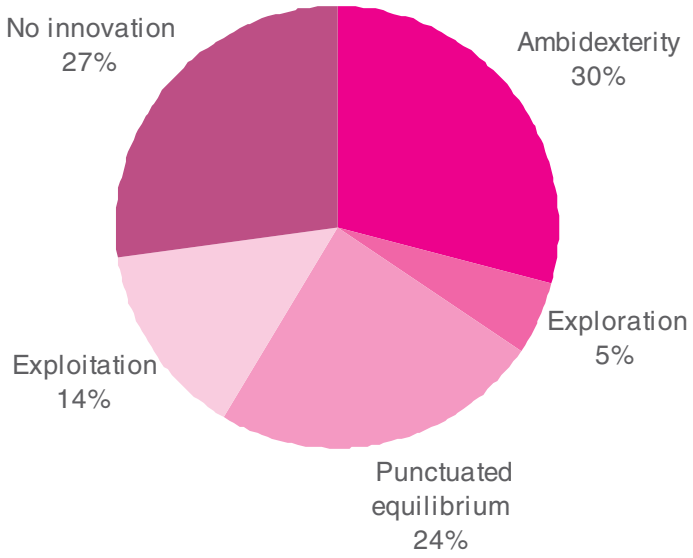


Figure 5. Segmentation of service firms according to the five types of innovation behaviour

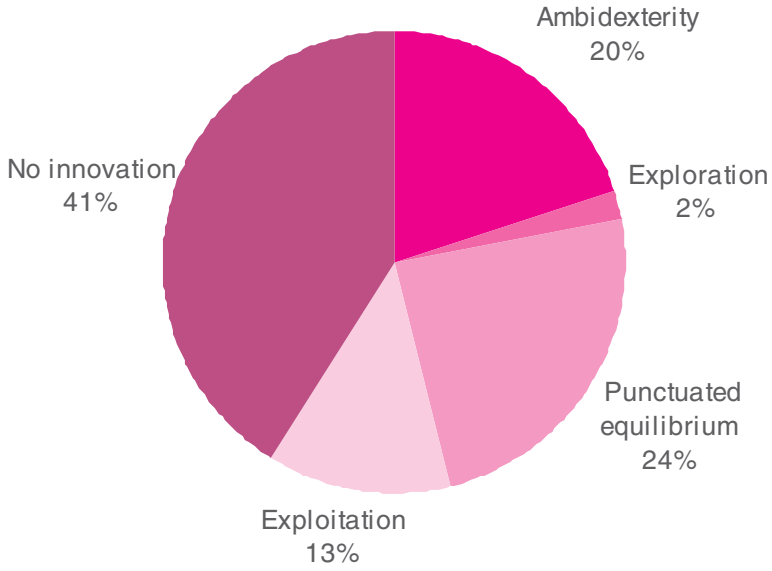


Figure 6 gives an overview of each industry in the manufacturing sector, which is based on 349 manufacturing firms. Figure 7 represents the segmentation of innovation behaviour for each industry, based on the four most represented industries in our sample. In the machinery and transport sector almost half of the firms are ambidextrous. In the coal, oil, chemicals and synthetics industry, there is also a higher frequency for ambidexterity compared to punctuated equilibrium. The food, drinks and tobacco industry apparently uses the punctuated equilibrium model more often than ambidexterity. The majority of the firms in the wood, paper and press industry claims to be not innovative.

Figure 6. Manufacturing industries represented in our sample

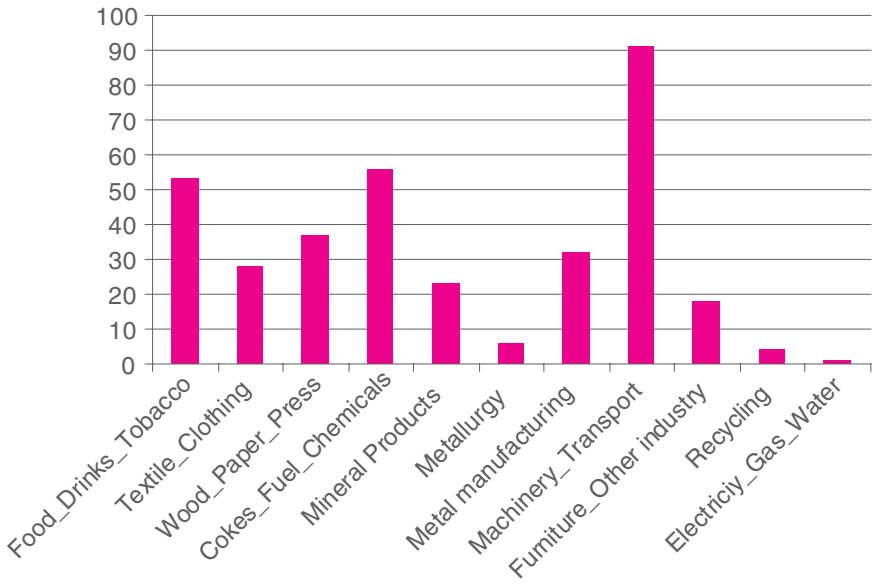


Figure 7. Innovation behaviour across industries in the manufacturing sector

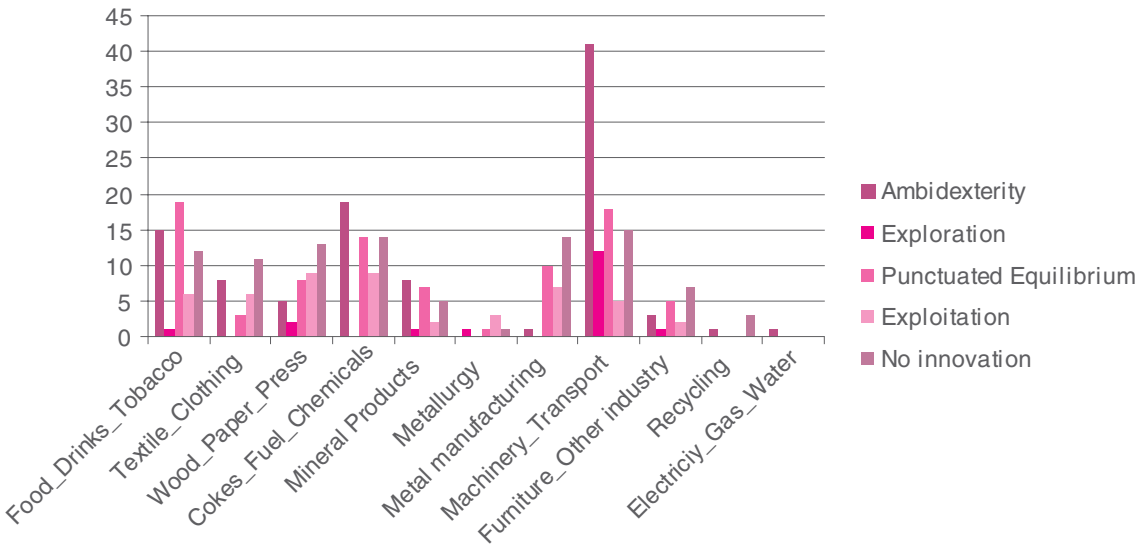


Figure 8 gives an overview of each industry in the service sector, represented in our sample of 184 service firms. Seven different service industries are distinguished.

Figure 9 shows the segmentation of innovation behaviour for each industry. Again, we take only a look at the best represented industries in our sample of service firms.

In the wholesale business the punctuated equilibrium is more often practiced than ambidexterity, nevertheless the frequency difference is minor. The majority of firms in the transportation and stocking industry are not innovative. The firms that do balance between exploration and exploitation are using the punctuated equilibrium mechanism more often than ambidexterity. The ICT industry clearly

shows a different pattern. In this sector, not only are relatively more firms innovative, compared to the other service industries the ambidexterity models prevails above the punctuated equilibrium model. Businesslike service firms have an equal frequency of ambidexterity and punctuated equilibrium.

Figure 8. Service industries represented in our sample

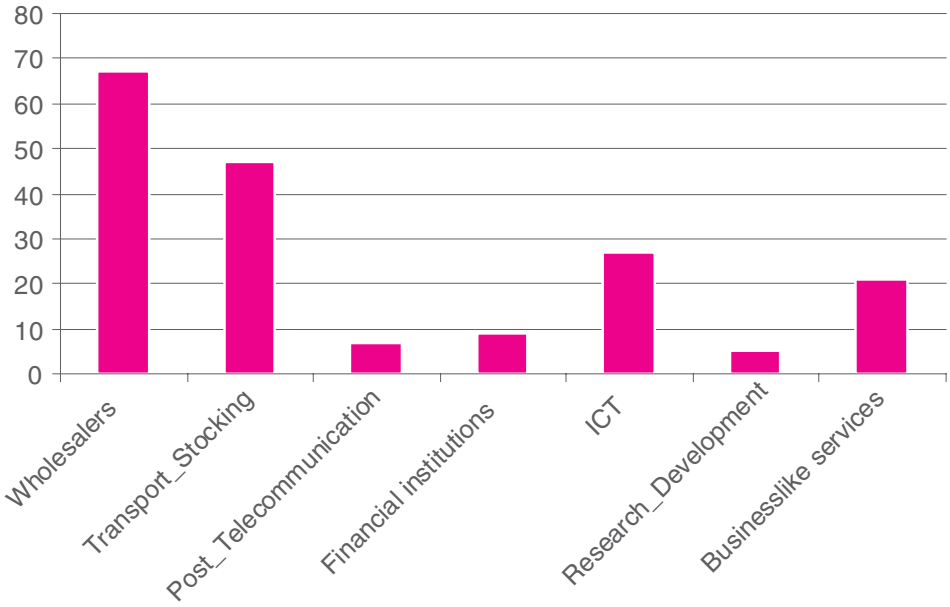
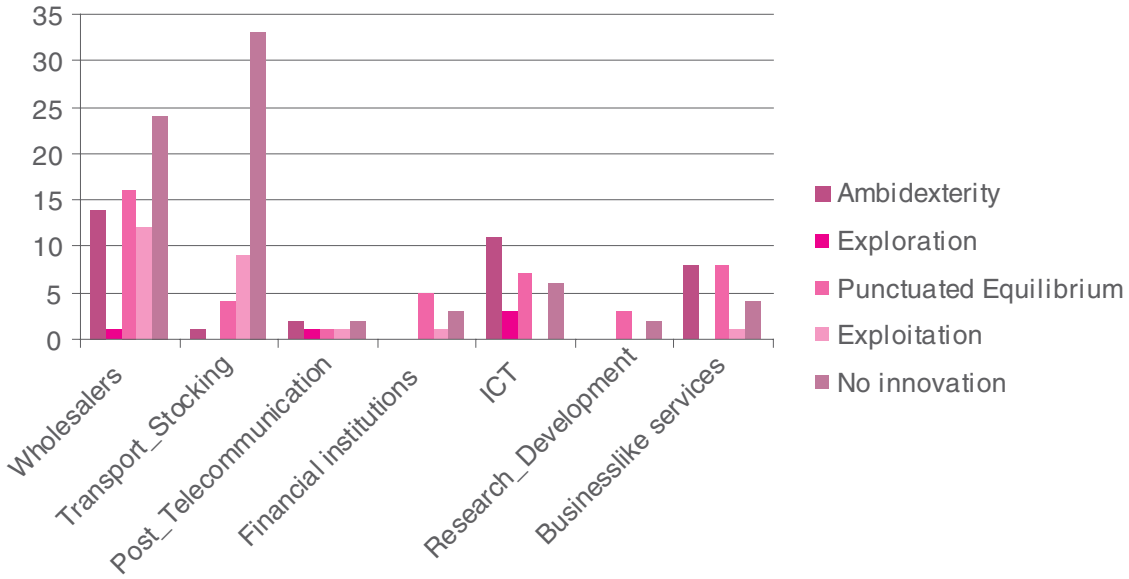


Figure 9. Innovation behaviour across industries in the service sector



2. Statistical regression analyses explaining ambidexterity, punctuated equilibrium and the effect on firm performance growth

The results of the multinomial logistic regression analysis are shown in Appendix B. Our data provide support for our hypothesis that manufacturing firms are more likely to use the ambidexterity model than service firms. The results also suggest that ambidexterity can be explained by firm size, firm type and engagement in R&D, while punctuated equilibrium can be explained by engagement in R&D only.

Appendix C presents the results of the hierarchical regression analysis where innovative behaviour is regressed to firm performance. Our findings indicate that there is no effect of firm type on ambidexterity or punctuated equilibrium related to performance growth. However if we simplify our analyses and compare balanced versus unbalanced behaviour, we do find that balanced behaviour (i.e. either achieved through ambidexterity or punctuated equilibrium) positively affects firm performance. In general, we can conclude from our regression analysis that firms with balancing innovation behaviour, applying an ambidexterity or punctuated equilibrium model, experience positive effects in their firm performance on the long-term compared to firms who focus solely on exploration or exploitation. However, we do not find evidence assuming that manufacturing firms with ambidextrous behaviour achieve better firm performance compared to manufacturing firms with a punctuated equilibrium model. The same is true for service firms with a punctuated equilibrium model compared to service firms that are ambidextrous.

Although we find a difference in innovative behaviour between service and manufacturing firms, we cannot relate this difference in usage of these models to differences in firm performance. Apparently something else than firm performance makes that service firms prefer the punctuated model over the ambidexterity model. The case research is used to gain insight in why service firms choose for ambidexterity or punctuated equilibrium.

3. Why and how Flemish service firms organize a balance between explorative and exploitative innovation activities

In order to gain in-depth knowledge in why and how Flemish service firms achieve a balance between exploration and exploitation, we applied case study research in three of these firms. Our case study research entails an innovation audit (performed by the Innovatiecentrum), a structured questionnaire and an interview. Two visits were performed in each firm. Our exploratory research took place in the course of the first visit. During our second visit we provided feedback on the innovation audit and practical advice in order to optimise the innovation capabilities of the firm.

Table 1 gives an overview of the general characteristics of each case based on the different measurement methods. Following Paswan et al. (2009), we differentiate three important contextually relevant dimensions in which service innovation is anchored: environmental uncertainty, strategic orientation and market orientation. Environmental uncertainty is defined as the inability to predict future changes in components of the environment (Buchko, 1994). Strategic orientation is described according to the differentiation-cost leadership dimension in Porter's strategy typology (Porter, 1980). A distinction is made between cost-control-oriented firms and firms that employ a differentiation strategy. Market orientation captures the recognition of needs of the target market and the internal choices made to satisfy those needs, implying customer orientation, competitor orientation and interfunctional orientation (Slater & Narver, 1998).

Table 1. Characteristics of the studied service firms

	CASE 1 - Touroperator	CASE 2 – Study and design office	CASE 3 – Wholesaler
Innovation behaviour type	Ambidexterity	Punctuated equilibrium	Punctuated equilibrium
Innovation power	81,7%	42,2%	70,2%
Total employees	55	25	174
Profit growth %	1%	18%	8%
Organisation type	Product/divisional organisation	Project organisation	Product/divisional organisation
Environmental uncertainty	High	Low	Medium
Market orientation	High market and customer orientation	High customer orientation	High market and customer orientation
Strategic orientation	Differentiation strategy	Differentiation strategy	Differentiation strategy
Innovation administrator	Business-unit manager or initiator	Initiator	Business-unit manager or division
Influence of innovations on profit	Difficult to know	Difficult to know	Difficult to know

	CASE 1 - Touroperator	CASE 2 – Study and design office	CASE 3 – Wholesaler
Relation with the customers	➢ Delivering standard services ➢ Delivering custom-made services ➢ Customers are in general other companies ➢ In general long-term relationships	➢ Delivering custom-made services ➢ Customers are in general other companies ➢ In general long-term relationships	➢ Delivering standard services ➢ Delivering custom-made services ➢ Customers are in general other companies ➢ In general long-term relationships
Development of new services	➢ Innovation is important ➢ There is no formalization of innovation projects ➢ There is no separate innovation budget ➢ Employees are expected to spend a part of their working hours on new developments ➢ Most of the innovations are part of commercial projects for external customers	➢ Innovation is quite important ➢ There is no formalization of innovation projects ➢ There is no separate innovation budget ➢ Employees are not really expected to spend a part of their working hours on new developments ➢ Most of the innovations are part of commercial projects for external customers	➢ Innovation is very important ➢ The organisation of innovation projects is moderately formalised within the organisation ➢ There is no separate innovation budget ➢ Employees are sometimes (more or less) expected to spend a part of their working hours on new developments ➢ Most of the innovations are part of commercial projects for external customers
General statements	➢ Services are complex because they consist of a lot of components ➢ Product/Service development is very important to stay into the market ➢ A lot of uncertainty exists on the technologies that will determine the market in the near future ➢ Try to be frontrunner in development and implementation of new services ➢ Trends are carefully being watched and implemented in case it is needed	➢ Services are complex because they consist of a lot of components ➢ Product/Service development is very important to stay into the market ➢ Product/Service development implies high investment costs ➢ Try to be frontrunner in development and implementation of new services ➢ Trends are carefully being watched and implemented in case it is needed	➢ Services are complex because they consist of a lot of components ➢ Product/Service development is very important to stay into the market ➢ New products and services are often aged after a short period of time ➢ Try to be frontrunner in development and implementation of new services ➢ Trends are carefully being watched and implemented in case it is needed
Focus Customer Value Proposition	Product leadership	Customer Intimacy	Operational Excellence

We present descriptions of each case to enlarge the in-depth knowledge concerning the balancing innovation behaviour in the studied service firms.

CASE 1 – Touroperator

Our first case was a travel agency with offices on five locations in Flanders. The firm already has a long history on the travel market. During the last 35 years, the company turned into a full-service firm with three distinct departments: holiday trips division, business trips division and groups, incentives and congresses division.
The travel industry is characterised by an increasing market concentration and vertical integration, which result in high competition. The margins of travel agencies are under high pressure. Even a very small economical turn back has immediately consequences in this industry. The environmental uncertainty is therefore high.
The travel agency has a strong market and customer orientation, by intensively obtaining and using information about competitors and consumers. The firm employs a differentiated strategy, with a focus on an outward and personalized knowledge management system, trying to obtain value and customer service experience enhancement.
The company has a strong growth ambition. They aim to double their turnover within five years. Together with experienced and qualified employees, the CEO sees innovation as crucial for successful and growing business. Continuous innovation on different fields is very important. A main challenge is to optimise the service costs without quality decrease.

Our quantitative and qualitative analyses conclude that the travel agency achieves a balance in exploration and exploitation by ambidexterity. Besides the described characteristics on environmental and firm level, Table 2 shows evidence illustrating the ambidextrous innovation behaviour.

Table 2.

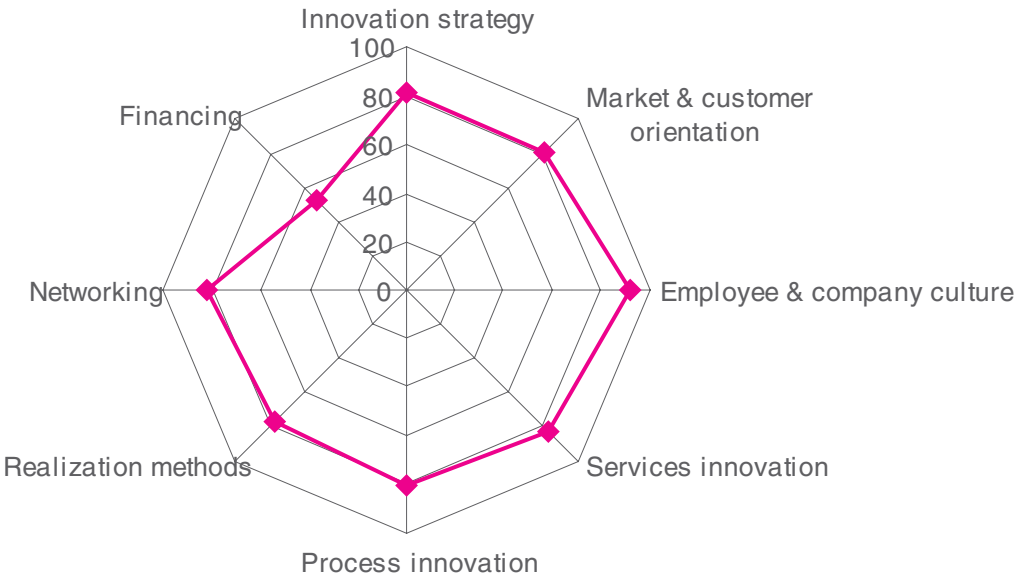
Evidence from Data Illustrating Ambidexterity
Continuous renewal of the service portfolio through exploration (e.g. theme travels, services for new markets, totally new gift boxes)
Strong focus on process innovation (e.g. supportive services like web platform, aligning of processes)
“Exploration is of equal value to exploitation.”
“We need to continuously focus on process improvements and development of new services while taking into account our market.”

The innovative growth strategy also entails strategic networking. Recently, the travel company has become a network partner in a large worldwide renowned organization, entailing travel agencies in 160 countries. This network membership enlarges the market power, service degree and is useful for exploring new trends in the market. Service delivery is increased and optimised in a proactive way.
There is no dedicated innovation unit in the company. According to the CEO, innovation is a concern of everyone in the company. For example, work groups are developed to establish improvements, create new ideas, etc. In addition, collaboration with external partners (suppliers, customers, network partners) to generate ideas is important.

Top management clearly defines the mission and vision of the company, and stimulates every employee to follow the strategy.

As shown in Table 2, the company has a high innovation power of almost 82%. The innovation audit concludes that there is a potential of 18% that can be improved. Figure 10 shows the scores on the eight examined management fields.

Figure 10 Outcome innovation audit



CASE 2 – Study and design office

Our second case was an industrial study and design office. Over a period of 20 years this company has become a significant player in the market with 25 employees. Employing 'the right' staff is a key differentiator between concurrent firms. Unfortunately, the company experiences problems in attracting and retaining qualified employees, resulting in a huge barrier for firm growth.
The company operates in a market characterised by price inelasticity and transparency. Therefore, very little space is available to experience with flexible prices. Little competition exists on the market in which the company operates. Operational excellence is crucial. In this context, the CEO strives for process improvements with a focus on automation of frequently executed tasks. Innovation is particularly seen as incremental improvements. There is no need to focus on radical developments.
The company aims at a healthy and stable growth. The CEO applies a differentiation strategy. Quality, fastness and presentation are the three key values. Quality is achieved by employing highly qualified people. Fastness is vital since the study and design office often operates on critical moments for their customers. Using up-to-date ICT applications and specific design programmes helps realizing it. The most important showpiece of the firm is a nice presentation of the study and design work. The designs have a high quality due to excellent software and printing machinery.

Our quantitative and qualitative analyses conclude that the study and design office achieves a balance in exploration and exploitation by the punctuated equilibrium mechanism. Besides the described characteristics on environmental and firm level, Table 3 shows evidence illustrating the practiced punctuated equilibrium innovation behaviour.

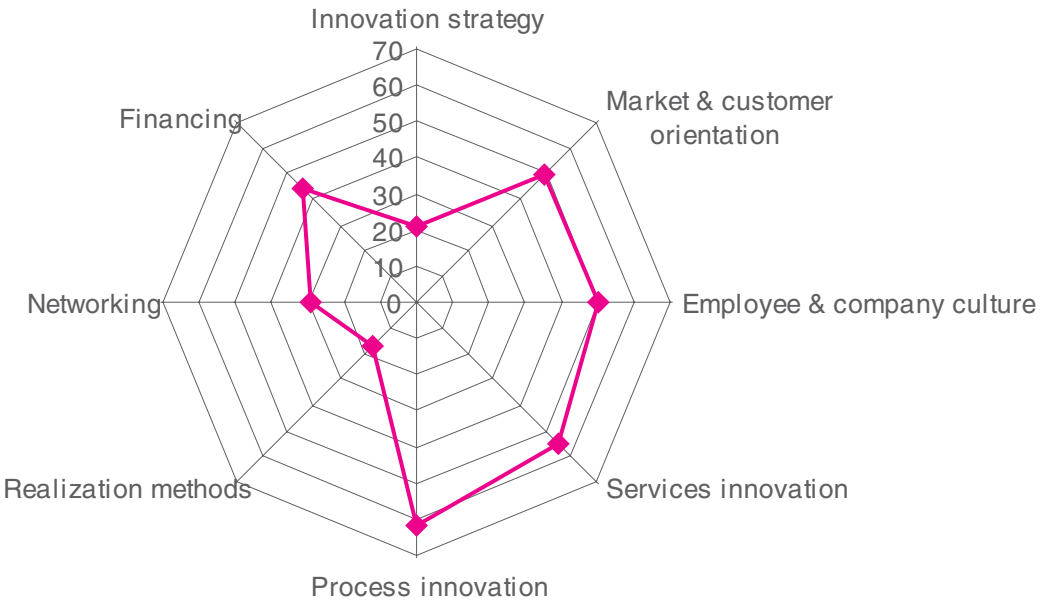
Table 3.

Evidence from Data Illustrating Punctuated Equilibrium
Explorative innovation activities take place ad hoc, when there is a particular opportunity/need at a certain moment (e.g. development of totally new pipes)
Focus on exploitation through incremental process improvements (e.g. design software improvement)
“Innovation is important to survive in the long term.”
“We are not systematically searching for new services; our focus is on process excellence through improvements of existing processes.”

According to the CEO, the company lacks a formal, written business strategy. Innovative activities mainly encompass incremental innovations of processes and services. In certain periods of time, radical innovations are developed. Development of incremental and radical innovations happens internally, so without external collaboration. Employees are stimulated to inform the CEO in case of having innovative ideas. If the CEO approves the idea to be further developed and implemented, the employee can work it out. However, a shortage of human resources frequently creates a barrier for innovation.

Following the outcome of the innovation audit, the study and design office has a rather low innovation power of approximately 42%. Taking into account the firm size and targeted market, there is some potential for increasing the innovation power. Figure 11 presents the scores on the eight audited management fields.

Figure 11 Outcome innovation audit



CASE 3 – Wholesaler

The third studied company is a technical distribution firm, part of a multinational concern. It supplies defined segments in the industry and also acts as a specialist on the market. The international group of technical distribution firms procures, stocks, processes, sells and distributes a wide range of high-quality engineering parts and provides a highly developed range of technical and logistic services. The company is a flexible partner to its customers while also having sufficient market share and volume to have a strong and complementary relationship with its manufacturing partners.

The market environment is originally characterized by strong competition. Nevertheless, the company has a unique generalist approach in its industry since they can offer their customers every technical component and service they might need. Competition is not able to provide the same services. A high customer orientation is essential according to the interviewees.

The international company has its own magazine for customers, suppliers and employees. In the edition of October 2009, the Managing Director states: *"We can only distinguish ourselves from the low wage countries by a resolute focus on innovation. We believe that innovation results in better performance and knowledge sharing should be seen as the foundation of successful collaboration."*

According to the interviewees, there is no real proactive innovation culture embedded in the thinking of the employees. The strong connections with its suppliers and customers are used to generate input and collaboration for innovative activities. A good market orientation forms a necessary factor for this process.

The firm employs a differentiation strategy, offering high quality, unique features and knowledge to their customers.

Our quantitative and qualitative analyses show that the wholesaler achieves a balance in exploration and exploitation by punctuated equilibrium. Table 4 shows evidence illustrating the punctuated equilibrium innovation behaviour.

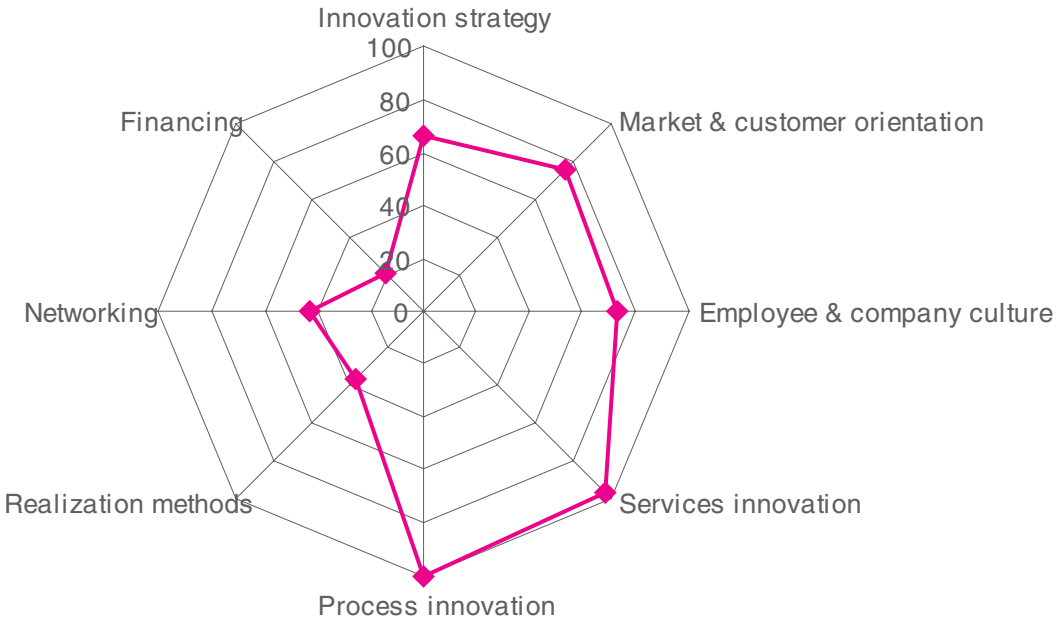
Table 4.

Evidence from Data Illustrating Punctuated Equilibrium
Radical innovations are developed ad hoc
Exploitative behaviour is continued
"We are not continuously busy with explorative innovation activities."
"We focus on efficiency improvements together with our suppliers and customers."

The Technology Center Manager explains that the company has no dedicated innovation unit, even not on the European level. According to the interviewees this is due to the fact that they are no manufacturers. The company aims to support its customers in developing and implementing innovations.

The innovation audit gives the wholesaler a total innovation power score of approximately 70%. Theoretically there is an improvement potential of 30%.

Figure 12 Outcome innovation audit



The multiple case study research reveals several understandings in why service firms choose for ambidextrous or punctuated equilibrium innovation behaviour.

Our case analyses shows that a highly competitive environment makes that a firm favours ambidexterity, while a low competitive environment tends firms towards the punctuated equilibrium model. The degree of competition seems thereby as a condition for ambidexterity or punctuated equilibrium.

During the interview and audit questioning it became clear that the business values carried out by the top management have a strong influence on whether employees exploit and explore simultaneously or alternate both innovation activities. The values carried by top management, together with the more general strategic orientation enable ambidexterity or punctuated equilibrium. We defined business values as the mission, vision and values translated by the management into actual behaviour.

It is clearly not the case that only large firms are able to employ ambidexterity. Firm size facilitates ambidexterity, but the internal organization of the firms seems to matter more. If management enables the employees to both explore and exploit at the same time, ambidexterity can be achieved in a small or medium sized company, as is the case for our studied travel agency. At the same time, due to a lack of human resources, explained in the case of the study and design office, ambidexterity may not be achieved in small size companies.

In general, we can conclude that firms choose for a certain balancing innovation strategy based on the market environment, available resources and values translated by the management.

None of the studied companies could estimate the impact of innovation on their yearly profit. There is no separate innovation budget in the three service firms and they have no insight in the total effect of innovation on firm performance. Services are being seen as complex because they consist of a lot of components. Each interviewee states that their company tries to be frontrunner in the development and implementation of new services. In addition they all point out that trends are carefully being watched and implemented in case it is needed.

The case studies also provided knowledge on how the service firms organize ambidexterity and punctuated equilibrium.

None of our three studied companies has a dedicated innovation unit. Besides the influence of firm size, this could be due to the service component in each firm. The interviewees in case 3 literally said that no innovation unit exists since the company is no manufacturer. This implies that there might exist a mental image of innovation units chiefly related to manufacturers.

The studied service firms emphasize their available knowledge capacities. The available knowledge creates a competitive advantage and is the foundation for innovation. By carefully selecting qualified employees, the companies try to increase and maintain their knowledge capacities. Through intensive market and customer orientation, the service companies develop incremental and radical innovations. Depending on the size of the innovation project, a group of people or a single employee develops the ideas. Since both providers and customers play an active role in the realization of services, these firms focus strong on the needs and experiences of customers when developing innovations. Actual collaboration with customers and/or suppliers is important for especially the study and design office and the wholesales firm. We remark that the ambidextrous travel agency proactively engages its employees to be continuously explorative and exploitative during their work. Moreover, as an example, specific working groups are created to generate and implement new ideas or improvements.

During the audit and interview we noticed that there is a shortage on innovation process methods in the studied service firms. For example, lack of a follow-up system etc. The three companies were willing to receive some support in their innovation management. They were not aware of the different opportunities that exist in getting support from governmental organizations and funding partners.

In this study we started from the idea that managers who integrate and reconcile both exploratory and exploitative activities can produce a continuous stream of innovations, encompassing both incremental and radical innovations. We assume that to survive in the long-term, service businesses need to generate continuous improvement of existing products and services and step-change or radical innovations. Although there seems to be no discussion on the value of innovation in the service industries, there is currently much more discussion on the question what service innovation is and how people are generate promising ideas for new services (Hermann, 2008).

Innovation in services focuses more on the 'softer' aspects of innovation-based skills (Gallouj, 2002; Miles, 2008). This means that the innovative aspect can be found in the underlying concept, in interaction with the customer, and the way the service is produced and distributed (Hermann, 2008). This is in contrast with the more harder form of innovation, which becomes evident in the (technological) feature of the service product itself. Because services are processes and customers do participate in many of these processes, it is not surprising that 'service innovations' are part of these processes. Continuous (process) improvements, carried out in partnership with individual customers, are certainly a common approach in service firms. This kind of exploitation is rather an unstructured, emergent process in itself (Heracleous, Wirtz, & Pangarkar, 2006), carried out in partnership with individual customers. It is the responsibility of many different people distributed across many different departments in the service firm. It is important that managers of service firms give their employees the time and the capabilities to figure out how to continuously improve their services.

A key question is whether service firms also need a more structured approach for explorations, leading to radical innovations. The case-studies seem to confirm that it is rather unusual to establish a unit ("a service innovation department") that is dedicated to explorative innovation in a service context. Without such a unit, exploration is not performed in a continuous way. This is a possible explanation why the punctuated equilibrium model is more popular in services than in manufacturing. Radical innovations are generated during concentrated periods during which the service firm wants to create a new service. In these periods, the whole firm is concentrating on the innovation, because a radical innovation leads to a fundamental change in the way the service business is performed.

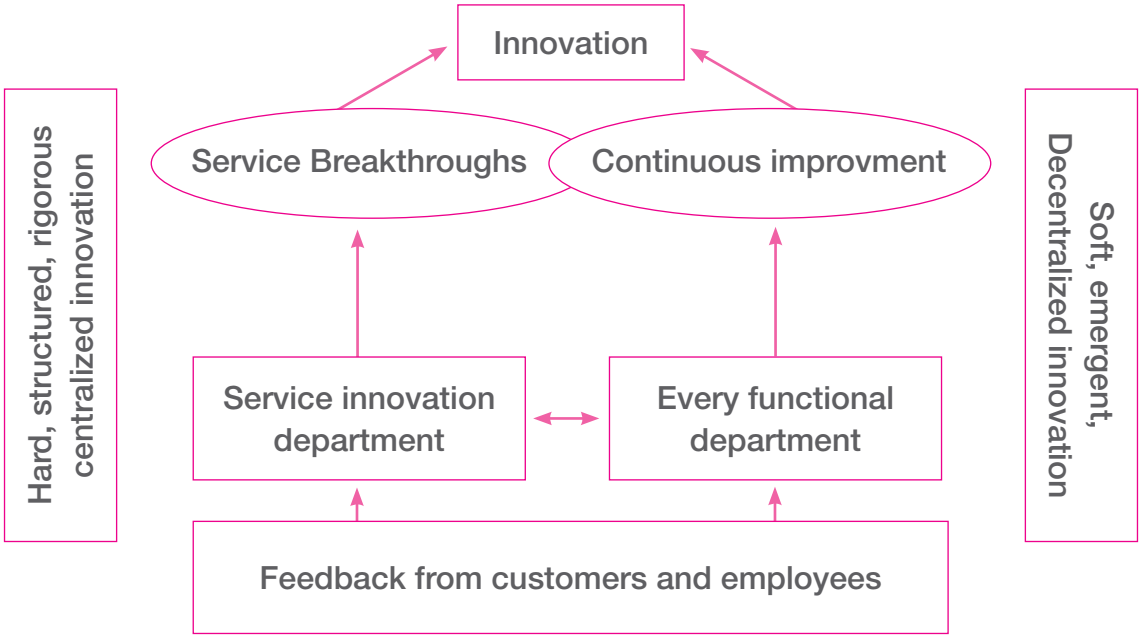
Our study further subscribes the finding that "innovation processes in the service sector evolve along less formalized routes than similar processes in the manufacturing industries" (Hermann, 2008). We further think that these routes can be very different, dependent on the type of industry. This makes it difficult to develop a standardized approach for innovation management in services. Nevertheless there are some common elements in these different routes: a thorough and clear understanding of the needs and expectations of clients and creating the conditions for the employees to develop a solution for these needs. Knowledge seems to be an important asset for these innovations (Fragnière, 2009).

A 'service innovation' strategy cannot be deployed without taking into account the customers. In many services, the customer is an active participant and in this role, the customer can contribute to service innovations. How this happens and whether this is based on exploration and/or exploitations is quite unclear. But finding a way to include the customer in the service innovation process is the challenge for the future.

Figure 13 summarizes the previous ideas and is based on the innovation strategy of the Singapore Airlines company (Heracleous et al., 2006). It leads to the following essential management questions:

1. How do we manage continuous improvement in every department of our company? Do we give enough incentives to our employees to come up with incremental new ideas for improvement?
2. Are we able to generate service breakthroughs if it is required? How do we organize this?
3. How do we involve our customers and employees in the service innovation process?

Figure 13 Innovation in service context: some essential components, based on (Heracleous et al., 2006).



Since multiple strategies for innovation through exploitation (resulting in incremental innovations) and exploration (resulting in radical innovations) exist, we conclude our managerial recommendations with an overview of those strategies in Table 5.

Bessant and von Stamm (2007) developed twelve strategies for discovering incremental and radical innovation concepts.

Table 5. Strategies for discovering incremental and radical innovation concepts, based on (Bessant & von Stamm, 2007).

Search Strategies	Characteristics
Sending out scouts	Detecting signs of competitive, technological, social and other changes that might generate innovations
Exploring multiple futures	Examines potential future scenarios in order to discover opportunities and risks of developments
Using the web	Using the world wide web as a source of information on trends and as a communication platform for the exchange of experiences
Working with active users	Integrating lead users into the innovation process with the aim of profiting from their know-how in the development and evaluation of possible innovators
Deep diving	Surveying customers through explorative methods, studying what people actually do. If necessary, observation and in-depth interviews can be applied
Probe and learn	Testing of potential innovations under real conditions with the objective of learning by experience even in case of a high risk of failure
Mobilize the mainstream	Involving non-expert employees in the generation of ideas for the extension and compensation of existing resources
Corporate venturing	Establishing corporate units with budget for special projects
Corporate entrepreneuring and intrapreneuring	Creating a corporate culture that encourages innovation through incentives and the authorization of projects
Using networks	Developing tools to enable the exchange of experience and information
Encouragement of diversity	Accepting a lateral thinking and encouraging interdisciplinary cooperation
Idea generator	Using creative techniques to increase radical innovations

In times of crisis, innovation is more important than ever. The companies that innovate today will make the difference tomorrow. Innovation should not be seen as an additional task during the daily work in a company. Innovating on an efficient way means innovating on an integrated way, straight through the core activities of a company. This is a large challenge, creating a continuous tension for managers. Services need to be delivered while attention should be paid to innovation through a less formalized, almost experimental approach.

"The future strength of our economy will be determined in an important way by the power of innovation within the services sector"
(Prof. Dr. h.c. mult. Wolfgang A. Herrmann).

The service sector has an important role in the economy and accounts for approximately two thirds of employment and GDP. Moreover, it is the only sector of the European economy that has generated jobs in the last years. In 2007, more than 155 million persons were active in European service activities. We remark increasing innovative activity in services, with services accounting for a greater share of R&D activity, patenting and trademark activity. Nevertheless, the share of service firms that innovate is still lower in comparison to the level of innovation in the manufacturing sector, with the exception of knowledge intensive services. Knowledge about services and innovation is still fragmented. The European Commission argues that knowledge about how to implement effective and relevant policy instruments is underdeveloped.

The above citation expresses the increased awareness of developed countries concerning the need to innovate in the services sector.
Flanders aims to become a top region in innovation. The Flemish government has the ambition to establish Flanders in the top five regions of Europe in 2020. This position is required to anticipate the social and economical challenges

It is acknowledged by multiple governmental studies[3] that Flanders still has a long way to go. At the start, Flanders should continue to increase its budget for research and development. This is in line with the 3% norm forced by the European Commission. In 2002, the three percent action plan was formulated by European Commissioner Busquin. European countries should invest 3% of its GDP in research and development. It was the ambition to realize this in 2010, but except for Finland and Sweden, no European country has accomplished that goal. According to recent governmental European benchmarking studies, Flanders has moderate position in total expenses on R&D[4] [5].

Governmental efforts concerning R&D and innovation are crucial for the economical and social development of a country or region. The Competitiveness Council stated in its conclusions of December 2006 that 'innovation policy should be best understood as a set of instruments. These aim at improving access to financing in support of innovation, at creating an innovation friendly regulatory environment and demand for innovation as well as at reinforcing the activities of institutions relevant for innovation, including the links between research institutions and industry'[6].

Today, the Flemish government has developed a plan to obtain the 3% norm in 2014. Addressing the current problem of fragmentation, six clusters were created, entailing fields in which Flanders has a strong position. These clusters should be considered as priorities for technology and innovation in Flanders: Logistech (logistics, transport and supply chain management), I-healthtech (ICT and health

3 Vlaamse Raad voor Wetenschapsbeleid, advice 131 Budget Science and Innovation 2009, http://www.vrwb.be/ Rekenhof, advies van het Rekenhof over de begrotingsrapportering door de Vlaamse Regering, december 2009, http://www.ccrek.be/NL/PublicatiesVlaamseGemeenschap.htm
4 Studiedienst van de Vlaamse Regering. Vlaanderen vergeleken. Vergelijking met topregio's in Europa, januari 2009.
5 Vlaams Indicatorenboek 2009
6 Council conclusions on 'A broad-based innovation strategy: strategic priorities for innovation action at the EU level', Competitiveness Council (2769th Council meeting), Brussels, 4th December 2006.

care), Meditech (health care), Nanotech (nanotechnology), Sociotech (ICT for socio economical innovation) and Ecotech (energy and environment).

It is acknowledged that firms need to balance exploration and exploitation in order to be effective in the short run and to survive in the long term. Also our research shows a positive effect of balanced innovation behaviour on performance growth. We believe that the Flemish government needs to stimulate not only innovation but especially the balancing innovation behaviour defined as ambidexterity or punctuated equilibrium. Successful companies must not only implement a wide range of incremental innovations, but also have radical innovations.

There are several initiatives in European countries that address the need to focus on innovation in service firms. For example, the German Federal Ministry of Education and Research has developed 'The Innovation With Services programme'[7]. This programme aims to help Germany achieve the same excellence in the services field as it exhibits in the field of industrial manufacturing. By providing funding to both research and business, the Innovation With Services programme helps to develop new tools and processes in the area of innovation management in service firms. Priority is given to methods for engineering innovation processes in the services field and to the issue of technology engineering for new services. The German government used a broad debate as basis for developing fields of action. The Innovation With Services funding programme has been developed through an intensive discussion process with representatives of research, trade and industry, intermediary and government organizations, and the social partners.
Another example of service innovation stimulation encompasses the ServLab, developed by the Fraunhofer IAO and its partners[8]. ServLab bundles the service excellence of the Fraunhofer IAO into a worldwide unique laboratory in which service innovation can be made visible and tangible. Computer and projection technology forms the core of the lab and enables the generation of service arenas as virtual spaces. Service innovations can be developed, tested and optimized together with employees, customers, and partner businesses. Situations and environments for service innovation processes can be simulated which allows 'service crash tests' within a controlled environment. The ServLab has made a major contribution to the encouragement of innovation within the service sector. As a result, international interest is displayed for creating ServLabs as locations for service innovation.

During our case studies it became clear that there is a lack of knowledge concerning engineering and managing innovation processes in Flemish service firms. Apparently, the Flemish government emphasizes technology in their innovation policy. Nevertheless, technology is no condition for innovation. Having technology does not directly imply innovative behaviour. The six defined clusters are still very broad and a clear link to service firms is lacking. Policy in services innovation is underdeveloped compared to policy in manufacturing innovation. Special attention should be paid to service firms. The development of policies in services innovation should take into account the sector's specificities related to the interactive and fuzzy nature of services, intangibility, heterogeneity, relative absence of quality standards and lack of market transparency.
Examining the policy of other countries together with private initiatives concerning service innovations will help the Flemish government in assessing what Flanders can do to increase innovation in the service sector. Services research that aims to help increase Flanders' innovation capabilities and

7 http://www.bmbf.de/pub/innovation_with_services.pdf
8 http://www.dienstleistung.iao.fraunhofer.de/EN/ServLab/index.jsp

increase its competitive strength needs to be established in many areas and closely combined with the area of application, the service sector.

Table 6 gives an overview of national policies fostering services innovation in Finland, Germany, Japan and New European member countries. This table is adapted from the research report of van Cruysen and Hollanders (2008)[9]

9 http://www.europe-innova.eu/web/guest/innovation-in-services/services-innovation-library/reports

Table 6. Examples of national policies fostering services innovation (van Cruysen and Hollanders, 2008).

Country	Program	Timing and Resources	Targets	Objectives	Challenges
Finland	Serve	From 2006 to 2010 Approx. 100 million euros – Tekes (Finish Funding Agency for Technology and Innovation) finances 50%	Emphasis on B to B services KIBS (software design, consulting, R&D, legal services, corporate finance and business administration, marketing, advertising, engineering) Trade Real Estate Services Industrial Services Financing and insurance Logistics Asset Management Services	Modernization of industries by service-driven business concepts (for manufacturing and construction sectors) Reforming service markets (for service sector) Development of new services concepts and service business based on these concepts	Role of customer in service business and service innovation process ➢ Understanding customer needs and turning them into profitable business ➢ Customer as a development partner Service Business Management and Leadership ➢ Creating a service mindset in organizations and their customers ➢ Pricing models and profitable business models Development of new service concepts ➢ Mechanisms for developing new services ➢ Scalability of services concepts
Finland	IPPS-innvation Policy Project in Services INNO-Net			Develop a common roadmap that will lead to: ➢ Possibility to prepare joint activities at transnational level ➢ Knowledge of possible barriers ➢ Knowledge of suitable and eligible partners for transnational cooperation	Exchange information and best practices with Member States Need for broad-based transnational collaboration activities in the field of service innovation In the long term, achieve an effective and balanced innovation policy which will be industry neutral Need for more balanced mix of innovation policy using both demand and supply side measures to promote innovations

Country	Program	Timing and Resources	Targets	Objectives	Challenges
Germany	"Innovation with Services"		Innovation management Fast-growing areas of the services sector People in service companies	Improve Germany's market position in the field of services Systematic development of new services plus guarantee of quality of existing services Establishment of conditions necessary for attractive jobs at various levels Realignment of service research according to economic, social and technological development	Cooperation between research and practice Public awareness International monitoring for areas of action and global trends
Japan	New Economic Growth Strategy	As from 2006	Healthcare and welfare services Childcare services Tourism and visitor attraction services Media contents Business support services Distribution services	Promote and facilitate accelerated innovation in the service sector, as one of the "Twin Engines for Economic Growth"	Promote international cooperation among related researchers and organizations: ➢ Establishment of networks among public, private and academic sectors ➢ Fostering research in services ➢ Development of human resources
New European Members Countries	Initiatives from different stakeholders		ICT and non-ICT related Service sectors and service functions SMEs as main targets	Based on own political, socio-economic and cultural environment Alliances Popularize good practices Pointing to different forms of service innovation Emphasis on education and training Cooperation and coordination among policies	Awareness building Lack of critical mass of innovation services Introduction of best practices of EU to NMS Upgrade administrative capacity Ensure policy coherence Manual/handbook for services innovation with case studies illustrating different dimensions of innovation in services

Today, the service sector is our largest value-added sector and generates the most jobs. This trend will be long-term, according to all experts in the field. Service firms should be seen as one of the great concerns of the 21st century in terms of innovation, growth potential and employment. Unfortunately, still little consciousness among government and practitioners exists on the important position of service firms in our economy and the need to innovate. Too often the service sector has been seen as the residual activities of the economy, what is left after classifying agriculture and manufacturing. Related to the success of the service sector it can be expected that this sector has a large innovative capability that makes it a driving force for growth and employment in a dynamic economy.
The main challenge of today's demanding environments is to achieve a balance between exploration and exploitation, or the ability to develop both incremental and radical innovations.

The purpose of this research report was to increase our understanding of the innovation behaviour in service firms, with a focus on ambidexterity and punctuated equilibrium. The management literature already suggested the importance of achieving a balance between exploration and exploitation, but previous research did predominantly focus on ambidexterity as a way to balance both innovation behaviours. This research report provides insight into both ambidexterity and the punctuated equilibrium model and the latter is found to be an alternative way to balance exploration and exploitation in less dynamic industries.
First, we quantitatively examined the innovation behaviour of service firms compared to manufacturing firms during the period 2002-2006. Second, by doing multiple case study research, we gained in-depth knowledge concerning why and how service firms achieve a balance between exploration and exploitation through ambidexterity or punctuated equilibrium.

The quantitative data analysis shows that ambidexterity is the most practiced innovation behaviour amongst the innovative manufacturing firms. This means that the majority of innovating manufacturing firms simultaneously explore and exploit. In comparison, the majority of the innovative service firms are employing the punctuated equilibrium innovation behaviour. Service firms more often continuously focus on exploitation, alternated with exploration in certain periods of time. These findings support our first and second hypothesis.
In general 54% of the manufacturing firms achieve a balance in exploration and exploitation through ambidexterity or punctuated equilibrium, compared to 44% of the service firms.

We found the remarkable result that more than 40 % of the surveyed service firms claims to be not innovative. This implies that they did not have explorative or exploitative innovation activities during the period 2002-2006, while this is the case for 27% of the manufacturing firms. One could question whether the high non innovative service firms are due to the Community Innovation Survey. Since the CIS has significantly improved during the past years and a clear focus on service firms is included, this is not a very likely explanation.

A solely focus on exploitation or improvements instead of developing something totally new, is applied by approximately 13% of the firms. This is an equal proportion for service and manufacturing firms. In addition, our longitudinal research shows that almost no service and manufacturing firms exclusively explore in their innovation activities. This result is not surprising since exploration often implies high costs caused by experimentations, high risk, etc. Our statistical analysis suggests that balancing

innovation behaviour has a positive effect on firm performance growth, whereas no positive effect on firm performance growth was found for exploitation or exploration only. We assume that these firms might have a higher performance if they would be ambidextrous or apply the punctuated equilibrium model.

Our industry-level analysis suggests that the level of innovation activity varies considerably across the different industries in the manufacturing and service sector. For example, the metal manufacturing industry in Flanders is characterised by a focus on exploitation in a way that innovations mainly encompass improvements. On the other hand, the machinery and transport industry is highly ambidextrous. Those companies are simultaneously improving and developing new products and processes. The majority of wholesalers apply a punctuated equilibrium innovation behaviour. The ICT industry is featured by ambidextrous innovation behaviour. Based on this analysis we can conclude that industry-specific factors, such as degree of technology, market, etc. have an important influence on the type of innovation behaviour in manufacturing and service firms.
There is no difference in effect on performance between service firms and manufacturing firms applying ambidexterity or punctuated equilibrium as a way to balance exploration and exploitation. Our data thus show that the choice of a firm to be ambidextrous or to use the punctuated equilibrium model produces no difference in performance.

Apparently, performance growth does not explain why the punctuated equilibrium mechanism is mainly preferred by the service sector. Multiple case study research was performed to gain in-depth knowledge in the choice of a service firm for being ambidextrous or applying a punctuated equilibrium model. There appears to be several drivers that determine whether ambidexterity or punctuated equilibrium is favored as a way to achieve a balance between exploration and exploitation. Based on our case study research, we conclude that when a firm has to choose for ambidexterity or punctuated equilibrium, two types of influencing variables can be distinguished. On the one hand, firms are confronted with exogenous variables. These are conditions that are beyond the power of the company and should be taken into account when deciding which innovation strategy to follow. Markets, competition, technology and regulation are key exogenous variables. These variables are related to environmental uncertainty. If managers are unable to predict future changes in components of the environment, the environmental uncertainty is high. A highly competitive environment tends service firms towards ambidexterity. When a high environmental pressure is experienced, firms could have no other choice than simultaneously exploring and exploiting in order to survive and to create competitive advantage. On the other hand, firms are facing endogenous variables which are created by the company itself. Market orientation, customer orientation and strategic orientation are the three main endogenous variables. For example, cost-control-oriented firms can be expected to deploy service innovation resources based on efficiency criteria. In comparison, firms with a differentiation strategy are likely to deploy innovation resources that alter value-adding elements in their service offering. Firms with a high market orientation intensively use information about consumers and competitors to develop competitive advantage.

Our case research makes us assume that firms experiencing a high level of competition are likely to be ambidextrous, while a low level of competition facilitates the choice for punctuated equilibrium. In addition, we remark that the business values carried out by the top management strongly influences the innovation thinking and acting of employees. If the top management does not stimulate exploration and/or exploitation, no employees will behave in an explorative or exploitative way. The values carried

out by top management, together with the more general strategic orientation, enable ambidexterity or punctuated equilibrium. Leadership has a crucial role in the innovation behaviour of firms. The available resources in a company are a third determinant concerning the choice of a balancing innovation strategy. Our cases show that a lack of resources influences the management to rather choose for punctuated equilibrium instead of ambidexterity.

A 'service innovation' strategy cannot be deployed without taking into account the customers. Continuous or incremental (process) improvements carried out in partnership with individual customers is a common approach in service firms. This kind of exploitation is rather an unstructured, emergent process in itself. Do service firms need a structured approach for explorative behavior, leading to radical innovations? The case research suggests that it is rather unusual to establish a unit ("a service innovation department") that is dedicated to explorative innovation in a service context. Managers of service firms need to give their employees the time and the capabilities to figure out how to improve and develop their services.
Our research further subscribes the finding that innovation processes in the service sector evolve along less formalized routes than similar processes in the manufacturing industries.
These routes can be very different, dependent on the type of industry. This makes it difficult to develop a standardized approach for innovation management in services. Nevertheless there are some common elements in these different routes: a thorough and clear understanding of the needs and expectations of clients and creating the conditions for the employees to develop a solution for these needs. Knowledge seems to be an important asset for these innovations.

The Flemish government highlights technology in their research and development policy. Unfortunately, little specific attention is given to service firms. There are multiple examples of other European countries that are focussing on the emerging importance of the service sector now and in the future economy. In order to become a top region in innovation, Flanders should have a clear vision on how to stimulate service innovation. Examining other European initiatives can be useful.

This study is subject to several limitations. First, due to data limitations, we could not investigate the impact of ambidexterity and punctuated equilibrium on a longer term than five years. Previous research provides evidence that using a time frame of five years to examine innovation behaviour (incremental and radical innovations) can produce reliable results, but it would be interesting to encompass a data observation period of 10 years or more, to gain additional longitudinal in-depth knowledge. Second, we used three cases for our qualitative research. We were not able to study more than three cases, due to the limited sample of potential cases we could study and the willingness of the CEOs to participate. Including more cases would enlarge our understanding of ambidexterity and punctuated equilibrium in service firms. In addition, a differentiation between business-to-business and business-to- consumer service firms could be made. We currently assume that our case study conclusions are the same for B2B and B2C. Further research can examine whether this assumption is true.

Based on this research report, a tool can be developed, assessing the current innovation behaviour and guiding companies in choosing the most appropriate type of balanced innovation behaviour. In practice, managers often struggle with the definition of innovation in their company. There is doubt about what actions and developments should be considered innovative. An innovation assessment tool can help companies gaining understanding about their current innovation behaviour. As this research report reveals, a solely focus on exploration or exploitation is not recommended. Moreover,

a balance should be achieved in both explorative and exploitative innovation activities. Our study illustrates that managers can apply both ambidexterity or punctuated equilibrium and generate the same performance effects. However, as our cases revealed, different drivers determine whether ambidexterity or punctuated equilibrium is more appropriate for the company. These drivers should be integrated in the tool, eventually pointing out ambidexterity or punctuated equilibrium as the preferred innovation method.
This study applied the existent innovation audit, developed by regional offices for innovation in Flanders. The tool has a strong background in best practices. However, an important weakness is the lack of taking into account firm and industry specific factors, such as firm size, etc. The audit tool compares the companies with best practices and results in practical advice. We noticed that several practical advices, resulting from the score on the audit, were difficult to apply in practice when a company for example only had 20 employees, compared with a larger company that had the same score and gets an identical advice. In addition, emphasis is placed on the well-defined advices, but one should keep in mind that these recommendations should not become a barrier for creative thinking and developing innovations. Future research can modify the audit tool and optimise its application.

Everyone talks about innovation. We all agree that innovation is decisive for competitiveness, but still a lot needs to be done in order to facilitate and stimulate innovation in Flemish service firms. Although there seems to be no discussion on the value of innovation in the service industries, there is currently much more discussion on the question what service innovation is and how people are generate promising ideas for new services. Flanders has a strong knowledge base which can generate a large competitive advantage. Managers should think on the long term. If a company wants to be successful on the long term, it should keep doing well what it does today (exploitation) and in the meantime preparing the firm for the future (exploration).
We hope this report provides some more insight in the importance of balancing both explorative and exploitative innovation activities, together with knowledge concerning the motives of service firms to follow the ambidexterity or punctuated equilibrium model.

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Appendix A: guidelines for interview

Innovation is defined as 'the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations' (OECD, 2005).

The interview questions encompass the following topics:

- Profit
- Influence of innovations on profit and turnover
- Engineering process of innovations
- Key values in the business strategy
- How many innovations are being developed during the period 2005-2008?
- Description of the radical and incremental innovations
- Importance of exploration / exploitation

Appendix B: multinomial logistic regression analysis

The results of the multinomial logistic regression analysis are shown in table 1 and 2. In this analysis, the probability of the model chi-square is significant 319 ($p < 0.001$). Table 1 shows that there is an overall relationship between the independent variables 'engagement type' (x^2,= 270, $p<0.01$) 'firm size' x^2,= 19.3, $p<0.05$) and the dependent variable 'innovation behaviour'. 'Type of engagement in R&D' ($p<0.01$) is significant in differentiating between groups defined by all the categories of innovation behaviour from the non-innovator group, see table 2. We conclude from this same table that 'firm size' ($p<0.05$) and 'firm type' ($p<0.05$) are statistically significant in differentiating the ambidextrous firms from the non-innovator (reference) group of firms, providing support for hypothesis 1, that manufacturing firms are more likely to use the ambidexterity model than service firms.
Our multinomial regression analysis suggest that ambidexterity can be explained by firm size, firm type and engagement in R&D, while punctuated equilibrium can be explained by engagement in R&D only.

Table 1. Multinomial logistic regression overall test of relationship between engagement type, firm size, firm type and innovation behaviour

	Chi-Square	Sig.
EngagementType	269.57	0.000
FirmSize	19.25	0.004
FirmType	10.87	0.092

Table 2. Multinomial logistic regression for engagement type, firm size and firm type data predicting subgroups of firm's innovation behaviour

	B Coefficient	Wald
1. Ambidexterity		
EngagementType	4.62**	114.42
FirmSize	0.30*	5.66
FirmType	0.75*	4.00
2. Exploration only		
EngagementType	4.42**	59.69
FirmSize	-0.33	1.95
FirmType	0.59	1.06
3. Punctuated equilibrium		
EngagementType	3.62**	85.21
FirmSize	0.17	2.10
FirmType	0.18	0.36
4. Exploitation only		
EngagementType	2.43**	35.67
FirmSize	-0.02	0.03
FirmType	0.26	0.69

* $p < .05$; ** $p < .01$

Appendix C: hierarchical regression analysis

Table 3 presents the results of the hierarchical regression analysis for innovation behaviour and firm performance growth. We standardized the variables to minimize multicollinearity. The maximum VIF within the models was 2.33, which is well below the rule-of-thumb cut-off of 10 (Neter, Wasserman, & Kutner, 1990). The baseline model 1 contains control variables. Model 2 introduces the innovation behaviour types and model 3 examines moderating effects of firm type on a firm's performance growth. The overall R-squared for model 2 and 3 shows that approximately 3% of the variability of performance growth is accounted for by the variables in the model. This low percentage was expected due to the in research widely acknowledged difficulties related to measuring effects on firm performance growth. Firm performance contains a lot of noise. It's very difficult to capture all the influencing variables in one regression model.

Regarding the effects of punctuated equilibrium on performance growth, model 2 shows that the coefficient for performance growth is positive and significant (x =0.107, $p < 0.05$). Ambidextrous behaviour has no significant coefficient. Regarding the moderating effect of firm type, model 3 shows that the interaction between firm type and ambidexterity is negative and not significant (x =-0.027, ns). Hypothesis 3 is thereby not supported. The interaction between firm type and punctuated equilibrium is also not significant (x =-0.007, ns), not supporting Hypothesis 4. Thus, our findings indicate that there is no effect of firm type on ambidexterity or punctuated equilibrium related to the performance growth.

Table 3. Results of Hierarchical Regression Analyses: Effects on Firm Performance Growth

	Model 1	Model 2	Model 3
Firm Size	0.027	0.016	0.021
Firm Type	-0.085	-0.084	-0.087
Intramural R&D Expenses	0.088	0.038	0.038
Exploitation		-0.008	-0.009
Exploration		-0.044	-0.045
Punctuated Equilibrium		0.107*	0.105
Ambidexterity		0.106	0.107
Firm Type * Ambidexterity			-0.027
Firm Type * Punctuated Equilibrium			-0.007
R2	0.014	0.031*	0.032*
Adjusted R2	0.009	0.018*	0.015*

Note. Standardized regression coefficients are reported.

*p<0.05

Table 4 presents the results of an additional hierarchical regression analysis with two transformed categories of balanced and unbalanced behaviour. As shown in model 2, the coefficient for balanced behaviour is positive and significant (x =0.130, $p < 0.05$). This result suggests that achieving a balance between exploration and exploitation positively affects firm performance on the long term. The overall R-squared for model 2 and 3 shows that 3% of the variability of performance growth is accounted for by the variables in the model.

Table 4. Results of Hierarchical Regression Analyses: Effects on Firm Performance Growth

	Model 1	Model 2	Model 3
Firm Size	0.027	0.017	0.018
Firm Type	-0.085	-0.085	-0.085
Intramural R&D Expenses	0.088	0.025	0.025
Balanced Behaviour		0.130*	0.129*
Unbalanced Behaviour		-0.024	-0.025
FirmType * Balanced Behaviour			-0.008
FirmType * Unbalanced Behaviour			-0.002
R2	0.014	0.030**	0.030*
Adjusted R2	0.009	0.021**	0.017*

Note: Standardized regression coefficients are reported.

*p<0.05, **p<0.01

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